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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,221	12/12/2005	Takeshi Nakao	36856.1399	2689

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EXAMINER	
GORDON, BRYAN P	

ART UNIT	PAPER NUMBER
2809	

NOTIFICATION DATE	DELIVERY MODE
06/11/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/560,221	NAKAO ET AL.	
	Examiner	Art Unit	
	Bryan P. Gordon	2809	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuhiro (JP 10065481) in view of Bauer (PGPub 2005/0212620).

5. Consider claim 10, Kazuhiro teaches a one-port surface acoustic wave resonator comprising a rotated Y-cut $LiTaO_3$ substrate (paragraph 0011); an interdigital electrode transducer disposed on the $LiTaO_3$ substrate an including electrode fingers (paragraph 0012); and reflectors disposed on both sides of the interdigital electrode transducer in a surface acoustic wave propagation direction of the interdigital electrode transducer (paragraph 0001). However Kazuhiro does not teach an electrode finger width of the electrode fingers of the interdigital electrode transducer is denoted by a and a gap between the electrode fingers is denoted by b, a metallization ratio, a/(a+b), is in the range of about 0.55 to about 0.85 and the interdigital electrode transducer is overlapping-length weighted.

In the same field of endeavor, Bauer teaches an interdigital electrode transducer is overlapping-length weighted (paragraph 0068) and implicitly teaches the claimed feature of the electrode finger width of the interdigital electrode transducer is denoted by a and a gap between the electrode fingers is denoted by b, a metallization ratio (paragraph 0107-0109), a/(a+b), is in the range of about 0.55 to about 0.85 (paragraph 0063) by showing that the gap between the ranges can be arranged according to different possibilities for the benefit of improving the Q-factor of the anitresonance frequency.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to make an interdigital electrode transducer is overlapping-length weighted suggested by Bauer with the surface acoustic wave

resonator with the electrode finger width of the interdigital electrode transducer to have a metallization ratio in the range of 0.55 to about 0.85 by showing that the gap between the ranges can be arranged according to different possibilities as suggested by Kazuhiro for the benefit of improvement the Q-factor of the anitresonance frequency.

6. Claims 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuhiro (JP 10065481) in view of Bauer (PGPub 2005/0212620), as applied to claim 10 above, further in view of Kando (PGPub 20040130239).

The previous combination does not teach the claimed one-port surface acoustic wave resonator, ladder-type surface acoustic wave filter, a film thickness and a cut angle of the $LiTaO_3$ substrate is in the range of about 36 degrees to about 60 degrees or 40 degrees to about 60 degrees.

In the same field of endeavor Kando teaches the claimed one-port surface acoustic wave resonator, ladder-type surface acoustic wave filter, a film thickness and a cut angle of the $LiTaO_3$ substrate is in the range of about 36 degrees to about 60 degrees or 40 degrees to about 60 degrees for the benefit of improved electromechanical coupling efficiency where coefficient of the second leaky SAWs is increased, variations in frequency resulting from manufacturing process are minimized, and the propagation loss is greatly reduced.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to include the above one-port surface acoustic wave resonator, ladder-type surface acoustic wave filter, a film thickness and a cut angle of the $LiTaO_3$ substrate is in the range of about 36

degrees to about 60 degrees or 40 degrees to about 60 degrees with Kazuhiro device for the benefit of improved electromechanical coupling efficiency where coefficient of the second leaky SAWs is increased, variations in frequency resulting from manufacturing process are minimized, and the propagation loss is greatly reduced.

7. Consider claim 11, Kando teaches a cut angle of the $LiTaO_3$ substrate is in the range of about 36 degrees to about 60 degrees (paragraph 10).

8. Consider claim 12 and 13, Bauer teaches the claimed feature of interdigital electrode transducer overlapping-length weighted (paragraph 0122), and further teaches experimentation with conventional ranges; where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimal or workable ranges by routine experimentation. In re Alller, 105 USPQ 233.

9. Consider claim 14, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an aluminum electrode having a film thickness of about 8% to about 14% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

10. Consider claim 15, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an aluminum electrode having a film thickness of about 9% to about 11% (although the reference is shown in decimal form if converted to percentage would fall

within the claimed range of the application) of the wavelength of the surface acoustic wave.

11. Consider claim 16, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an copper electrode having a film thickness of about 2.4% to about 4.2% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

12. Consider claim 17, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an gold electrode having a film thickness of about 1.1% to about 2.0% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

13. Consider claim 18, Kando teaches a surface acoustic wave filter including one-port surface acoustic wave resonator (paragraph 0081).

14. Consider claim 19, Kando teaches a surface acoustic wave filter is a ladder-type surface acoustic wave filter (paragraph 0081).

15. Claims 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuhiro (JP 10065481) further in view of Bauer (PGPub 2005/0212620) and further in view of Kando (PGPub 20040130239).

16. Consider claim 20, Kazuhiro teaches a one-port surface acoustic wave resonator comprising; a rotated Y-cut $LiTaO_3$ substrate; an interdigital electrode

transducer disposed on the $LiTaO_3$ substrate an including electrode fingers; and reflectors disposed on both sides of the interdigital electrode transducer in a surface acoustic wave propagation direction of the interdigital electrode transducer. However Kazuhiro does not teach an electrode finger width of the electrode fingers of the interdigital electrode transducer is denoted by a and a metallization ratio, a/(a+b) is in the range of about 0.55 to about 0.85, where an electrode finger width of the electrode fingers of the interdigital electrode transducer is denoted by a and a gap between the electrode fingers is denoted by b; the interdigital electrode transducer is overlapping-length weighted; and a cut angle of the $LiTaO_3$ substrate is in the range of about 40 degrees to about 60 degrees.

In the same field of endeavor Bauer teaches an interdigital electrode transducer is overlapping-length weighted (paragraph 0068) the electrode finger width of the interdigital electrode transducer is denoted by a and a gap between the electrode fingers is denoted by b, a metallization ratio (paragraph 0107-0109), a/(a+b), is in the range of about 0.55 to about 0.85 (paragraph 0063) by showing that the gap between the ranges can be arranged according to different possibilities for the benefit of improving the Q-factor of the anitresonance frequency.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to make an interdigital electrode transducer is overlapping-length weighted suggested by Bauer with the surface acoustic wave resonator with the electrode finger width of the interdigital electrode transducer to

have a metallization ratio in the range of 0.55 to about 0.85 by showing that the gap between the ranges can be arranged according to different possibilities as suggested by Kazuhiro for the benefit of improvement the Q-factor of the anitresonance frequency.

In the same field of endeavor Kando teaches a cut angle of the $LiTaO_3$ substrate is in the range of about 40 degrees to about 60 degrees (paragraph 10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to make an interdigital electrode transducer is overlapping-length weighted, the width of electrode fingers of the interdigital electrode transducer to have a metallization ratio in the range of 0.55 to about 0.85 as suggested by Bauer, at a cut angle of the $LiTaO_3$ substrate is in the range of about 40 degrees to about 60 degrees as suggested by Kando for the benefit of decreasing the frequency fluctuation.

17. Consider claim 21 and 22, Bauer teaches the claimed feature of interdigital electrode transducer overlapping-length weighted (paragraph 0122), and further teaches experimentation with conventional ranges where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimal or workable ranges by routine experimentation. In re Alller, 105 USPQ 233.

18. Consider claim 23, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an aluminum electrode having a film thickness of about 8% to about 14% (although

the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

19. Consider claim 24, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an aluminum electrode having a film thickness of about 9% to about 11% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

20. Consider claim 25, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an copper electrode having a film thickness of about 2.4% to about 4.2% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

21. Consider claim 26, Kando (Figure 1) teaches the film thickness of the interdigital electrode transducer is set such that a mass is equivalent to that of an gold electrode having a film thickness of about 1.1% to about 2.0% (although the reference is shown in decimal form if converted to percentage would fall within the claimed range of the application) of the wavelength of the surface acoustic wave.

22. Consider claim 27, Kando teaches a surface acoustic wave filter including one-port surface acoustic wave resonator (paragraph 0081).

23. Consider claim 28, Kando teaches a surface acoustic wave filter is a ladder-type surface acoustic wave filter (paragraph 0081).

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prior art Sen (JP 09093072 is relevant to this application because it refers to an electrode finger width of the electrode fingers of the interdigital electrode transducer.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan P. Gordon whose telephone number is 571-272-5394. The examiner can normally be reached on Monday-Thursday 7:30-5:00, Friday 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on 571-272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SUPERVISORY PATENT EXAMINER
5/26/07